

ANALYSIS OF INCORPORATING ELECTRONIC AND OTHER SOURCES OF KNOWLEDGE INTO THE CONTEXT OF TEACHING ELEMENTARY NATURAL SCIENCE

ANALIZA UKLJUČIVANJA ELEKTRONSKIH I DRUGIH IZVORA ZNANJA U NASTAVU PRIRODOSLOVLJA

Samo Fošnarič, Jurij Planinšec

Faculty of Education, University of Maribor, Maribor, Slovenia
Pedagoški fakultet, Sveučilište u Mariboru, Maribor, Slovenija

Abstract:

Efficient education is becoming the basis for life learning. Therefore teachers and parents need to look after the children's knowledge. This knowledge is not an endless learning by heart of enormous amount of data which are quickly forgotten, but a knowledge which needs to be efficient and functional in the future as well. The intention of the presented research in this article was to establish whether students in elementary natural science of nine-grade primary school in Slovenia use electronic and other sources of knowledge, how much they use them and if they use them at all. We find that students do use other sources of knowledge. Nevertheless, next to observing and listening to teacher's explanation and description, the use of school books and work books is still the most widely used source of knowledge. Learning by electronic sources and searching for information on the internet is, despite the fact that we are living in a computer-information era, still not present enough.

Sažetak:

Učinkovito obrazovanje postaje temelj cjeloživotnog učenja. Učitelji i odrasli trebaju voditi brigu o znanju djece. To ne znači, da dijete treba memorirati veliku količinu podataka, koji se brzo zaboravljaju, već težiti ka znanju, koje treba biti učinkovito i funkcionalno. Intencija rada je bila prikazati da li učenici u devetogodišnjem osnovnom obrazovanju Republike Slovenije u predmetu prirodoslovlje dovoljno koriste elektronske i ostale izvore znanja. Zaključujemo da učenici koriste različite izvore znanja, iako se među njima i dalje nalaze opažanje, učiteljevo izlaganje gradiva i opisivanje, korištenje udžbenika i poslovnih svezaka. S obzirom da živimo u računalno-informacijskom dobu učenje putem elektronskih medija i pretraživanje informacija preko Interneta se još uvijek dovoljno ne koriste.

Introduction

The objective of general education is to ensure that every student acquires basic skills for gathering information and handling this information which is in the modern information society a necessity for a successful continuation of education /1/. More and more often we are faced with the fact that we live in an information era where information are gaining on their importance.

Modern school is trying to adjust to these changes. School curriculum are becoming more interesting and their objectives are set in such a way that children and teachers are required to understand the subject, not merely remember it. This means that project work,

research learning, laboratory experiments and group work are being incorporated into class along with the use of very diverse sources of knowledge, from books, television and video tapes, to internet and other sources. School had to adjust to the changed demands of time. According to Kroflič /2/ there are three basic civilisation shifts which demand changes. These are: transfer into information era, different, post-modern understanding of moral values, and the general change of educational factors such as family, media, mass culture and other coincidental educational factors. These new tasks require, first of all, a change in teacher's position in the classroom and organisational changes at school as well as in the institution. The

school and institution respectively need to include a wide choice of available information sources and incorporate these sources into class in a creative way and with great didactic skills. Nowadays, information and new knowledge spread and change very quickly. Therefore, school needs to primarily become a direction pointer towards the search for knowledge.

Kubale /3/ believes that acquiring new knowledge is the basic task of class activity. All other tasks such as formal education and educational tasks are connected to the basic one. At this point students acquire new knowledge and information. In this phase, primary sources of information such as observing objects and occurrences are most important /4/.

Secondary sources of information are teaching materials, teacher's explanations and students' experience. All of these sources are nowadays supplemented by more modern sources of information. The latter can be acquired through numerous electronic media, among which computers have the lead. High-quality computer programmes nowadays enable students to achieve better results compared to traditional class /5/. At the same time, the diversity of computer use enables us to achieve different educational objectives /6/. The latter can, of course, be obtained in an even easier way through the use of World Wide Web – Internet.

Experts agree that such learning with the help of diverse sources of knowledge is becoming a part of educational strategies which will increase intellectual abilities of students /7/.

Methods

Considering the fact that Slovenian school system transferred from eight to nine grades our research concentrated on the applicability of different sources of knowledge in natural science in the second triad of nine-grade primary school. Therefore our main interest was to establish the following

- by students:
 - use of different sources of knowledge in classes of natural science

according to:

- class which the students attend
- by teachers
 - use of different sources of knowledge and encouragement of students to use these sources during classes in natural science

- the benefits of the knowledge acquired in classes of natural science

according to:

- class that they teach
- working period

Participants

The sample consists of students of fourth and fifth grade in nine-grade primary school, and teachers, who have taught fourth and fifth grade in the same school year. The sample included 168 students, high percentage of them was attending fourth grade in a nine-grade primary school. At the same time 32 teachers were included in the research, a high percentage of them were teachers who teach fourth grade in a nine-grade primary school. The latter had the highest percentage of teachers (43,8 %) who have been teaching for more than 20 years.

Instruments

Two different questionnaires were used in the research. One was intended for students and the other for teachers. In most cases the questions were similar. The questionnaire for students consisted of 8 closed-ended questions which referred to the use and popularity of different sources of knowledge in classes of natural science, and to the use of sources in general life situations. The questionnaire for teachers consisted of 10 close-ended questions which referred to the use and popularity of different sources of knowledge, encouragement of students in using these sources and applicability of knowledge acquired in classes of natural science. Beside these questions the instrument included an objective fact (working period).

Procedure

Gathering of data was performed individually where every person filled out the questionnaire alone. Data, acquired through the questionnaire were presented in tabular form (absolute frequencies and calculated percentage frequencies). Subordinate relations among variables were tested by a chi-square test whereby we preliminarily excluded or joined categories with low frequencies as well as variables with no frequencies.

Results and Discussion

In the nine-grade primary school in Slovenia the way of learning through school books in natural science in

the II. triad is still the leading method. Research has shown that only 6% of teachers bring pictures, books, models or lexicons which the students learn from.

This fact is also confirmed by students who claim that the most frequent way of learning in natural science classes is still through school books and work books. For classes in natural science, fourth-grade students stress observing things and animals in person, fifth-grade students stress teacher's narration, explanation and description. We anticipate that the difference in teaching is deliberately made by teachers themselves because of the age difference between classes and the development stage of children whose way of thinking becomes more and more abstract each year. It is interesting to see that there is a statistically significant difference in the prevailing way of students' learning in classes of natural science according to the grade they are attending ($\chi^2 = 20,3 > \chi^2_{(0,05)} = 3,84$; $g = 3$) = 7,815). We can therefore observe (Table 1) that modern sources of knowledge (internet, computers, DVD, etc.) are poorly represented in classes of natural science. Table 1: Number of students (f) and structural percentage of students (f%) according to the smallest use of knowledge sources in classes of natural science

SMALLEST USE OF KNOWLEDG SOURCES	f	f%
Viewing of pictures, movies	30	17,9%
Textbooks	8	4,8%
Books, encyclopedias, papers, journals	11	6,5%
Computers, CD, DVD, internet	119	70,8%
Total	168	100%

What is also discouraging is the fact that most students claim that they never use computers and CD-ROMs or DVDs (43,3%) and internet (41,7%) in classes of natural science. In forth grade 60% of students claim they don't use internet, and in fifth grade the percentage of those who don't use computers, CD-ROMs and DVDs is higher (50,7%). Among unused sources in the fifth grade is also observing objects and animals in person, but this method is used in forth grade (Table 2). There is a statistically significant difference between students in unused sources of knowledge during classes of natural science according to the grade they attend ($\chi^2 = 17,7 > \chi^2_{(0,05)} = 3,84$; $g = 5$) = 11,700).

Table 2: Number of students (f) and structural percentage of students (f%) and their claims about the unused sources of knowledge in classes of natural science according to the grade they attend

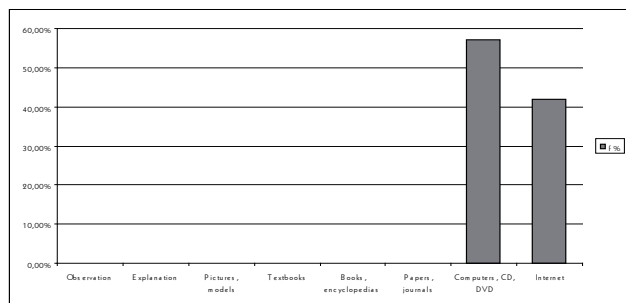
CLASS	4.		5.		Total	
	f	f%	f	f%	f	f%
UNUSED SOURCES OF KNOWLEDGE						
Observation	0	0,00 %	8	11,9 %	8	6,70 %
Viewing of pictures, movies	2	3,80 %	5	7,50 %	7	5,80 %
Textbooks	0	0,00 %	1	1,50 %	1	0,80 %
Books, encyclopedias, papers, journals	1	1,90 %	1	1,50 %	2	1,70 %
Computers, CD, DVD	18	34,0 %	34	50,7 %	52	43,3 %
Internet	32	60,4 %	18	26,9 %	50	41,7 %
Total	53	100 %	67	100 %	120	100 %

The bad news in all of this is that the students are relatively satisfied with the classes in natural science (39,3%), only some of them miss observing live animals, natural things and occurrences (32,7%) and a minority misses modern sources of knowledge such as computer and internet (25,6%).

Students do not usually get bored in classes of natural science and 61,3% of interviewed students are of that opinion. Students who are bored usually don't like school books and workbooks (17,9%), there are also a few students who are bored with books, encyclopaedias, magazines and newspapers (9,5%).

It is also worrying that on teachers' list of unused sources of knowledge in classes of natural science (Figure I) there are no other sources beside modern – electronic sources of knowledge such as computer, CD-ROMs, DVDs. Even in the nine-grade primary school the electronic sources of knowledge are insufficiently represented. Working period of teachers does not play a significant role in this fact.

Figure I: Structural percentage (f%) of teachers according to unused sources of knowledge in classes of natural science.



Among other things, the research has shown through an analysis of knowledge applicability and use of sources in real life situations that the majority of students, regardless of their grade, use the knowledge, acquired in natural science classes, at school and at home. Statistically significant differences between students according to the grade they attend were detected in used sources of knowledge outside school classes. At home, forth-grade students mostly use the method of observing things before they ask relatives, acquaintances or other people. Fifth-grade students ask their relatives or other people first or they use the computer and internet to find the information they need. Older students are already able to find specific information by themselves.

It is also interesting that 21,3% of interviewed teachers never use certain sources of knowledge in their classes of natural science. The majority of these teachers have the longest working period among the teachers included in the research. Sources, which these teachers don't use are computers, CD-ROMs, DVDs and internet.

Conclusion

In the end, we can confirm our anticipations that students' use of different sources is increasing, that their learning is no longer passive, as in traditional school, but active. Students are mostly satisfied with teaching methods in natural science classes and are not bored during classes. They use the knowledge, acquired in natural science subject, at school and at home. Establishing the fact that students are able to search and find the right information is very encouraging. They mostly use computer and internet to do that although teachers at school rarely or never use this type of information sources. Prior to our research we anticipated that teachers use computers and internet a lot and this proved to be wrong. The most surprising fact of the research was finding out that teachers of natural science

very rarely or never use computer programmes or internet. If they have the possibility, students like using this type of information sources very much, especially at home. The whole research conveys a unique message, namely that teachers are the sole direction pointers to students. Only with teachers' guidance students will manage to find their way in the world of accumulated information. Therefore we should try to offer students the most and the best we can in hope they are able to accept it all.

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